Chapter 13
Theater Missiles

The trend among military forces for acquisition of theater missiles has expanded with the growth of regional rivalries and the strategy of using long-range strike capability to gain regional leverage. Theater missiles can be categorized among two types—theater ballistic missiles (TBMs) and cruise missiles. They are launched from ground launchers, aircraft, or naval vessels. These systems are designed for deep strike missions—beyond those of close battle assets. Because of the high cost and limited numbers of these systems compared to artillery, they will be used against high-priority targets at critical phases of a conflict, or against political targets. Selected OPFOR forces with limited numbers of missiles may hold them in a separate missile unit at echelons above the supported ground force commander. Those missiles may be used for purposes other than execution of military strike missions. Where missiles are subordinate to the ground force commander, they will be used as another strike asset to support his plan.

The OPFOR cruise missiles can be launched from ground launchers or naval platforms. Air-launched cruise missiles (ALCMs) are treated as munitions in aircraft chapters. Foreign ground and sea-launched cruise missiles are generally employed in an anti-ship role. However, applications may be developed for use against ground targets. Such systems can be addressed in future WEG updates.

The TBMs employ a high-atmosphere or exo-atmospheric ballistic trajectory to reach the target. That trajectory is easier to track than a cruise missile flight profile; however, the TBM can deliver a high-lethality payload a long distance quickly, and for most of its trajectory, it cannot be intercepted by even state-of-the-art anti-ballistic missiles (ABMs). These missiles are launched from ground launchers or naval platforms. Ground launchers include—

- Fixed ground launchers (usually associated with hardened underground sites).
- Mobile launch complexes with dozens of vehicles and significant set-up time.
- Trailer launchers.
- Highly mobile transporter-erector-launchers (TELs).

Launchers vary from older systems with simple modifications, to specialized vehicles designed for operation in all types of terrain. Newer launchers may incorporate improved mobility to reduce vulnerability to location by terrain anaysis and intelligence preparation of the battlefield.

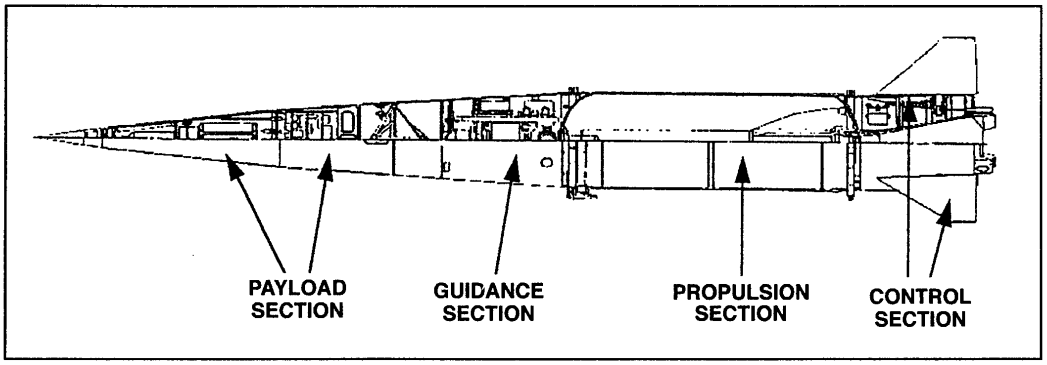
The missile system is selected for a mission based on its ability to reach the target within targeting timelines, and its ability to deliver effective lethality on the target. Improved heavy multiple- rocket launcher systems with course correction and increased-lethality warheads have replaced TBMs as preferred strike systems against selected deep targets. For instance, a Russian 9A52 MRL can deliver twelve 300-mm rockets 70-90 km with precision and minimal preparation time. However, a modern TBM can deliver twice the payload a farther distance with better precision against critical heavy targets.

Keys for timely delivery include target location, fire mission calculation and transmission, launcher and missile responsiveness, reload time, and move times. Therefore, modern missile system support equipment can include computerized fire control and location/navigation systems (such as global positioning systems), as well as dependable and secure communications.

The most critical component of a theater ballistic missile system, which differentiates system capabilities and limitations, is the missile. Missiles are generally classified according to their range—

- Short-range ballistic missile (SRBM), 0-1,000 km.
- Medium-range ballistic missile (MRBM), 1,001-3,000 km.
- Intermediate-range ballistic missile (IRBM), 3,001-5,500 km.

Various approaches are used to improve range, such as lengthening missiles for increased fuel and longer burn time, improving motors (in the propulsion section), using more efficient solid fuel motors, and employing smaller and lighter warheads. Below is an example of a modern missile (the Russian Tochka-U SRBM) and its major components.



The warhead (within the payload section) is the munition, the lethality mechanism which is selected for that strike mission and around which the system is designed. Many countries acquired ballistic missiles specifically to deliver weapons of mass destruction (WMD) against civilian targets such as urban centers. For such a mission, a less accurate system with a large payload capacity is sufficient for the mission. A substantial proportion of SRBM and some MRBM designs are copies or variants of the former-Soviet SCUD-B/SS-1c. Although these systems lack accuracy and responsiveness of some the newer systems, they can deliver large lethal payloads against fixed targets or targets whose limited mobility permits them to be stationary long enough for the TBMs' operational timelines.

A number of newer TBM designs with improved range, accuracy and operational considerations have been fielded. Modern warhead developments include separating warheads, multiple warheads, maneuvering reentry vehicles (RVs), varied lethal and electronic warhead fills, warhead buses (varied submunitions), precision navigating and homing warheads, and warheads with

countermeasures (penaids). Separating and maneuvering warheads, penaids, and other technical measures will further challenge the capability of theater missile defense assets to prevent strikes against priority targets.

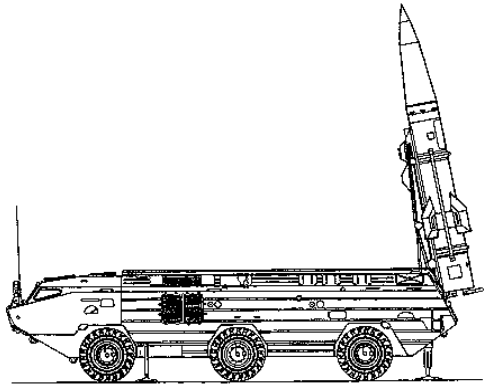
Operational timelines include launcher emplacement and survey times, mission transmission time, missile preparation time (which includes aiming), launch sequence, displacement time, move to a hide/transloading point, then move to the next launch point. Target location, command and control, and fire mission transmission times are separate. Often the launcher will be emplaced with some launch preparation steps completed and ready for a mission. These steps may sacrifice accuracy for reduced exposure time. More modern launchers will have a minimal preparation time between emplacement and execution of a fire mission.

After a launch, the launchers will displace as quickly as possible (often <5 minutes) to reduce the possibility of detection and tracking, and to avoid strikes from specially-assigned counter-missile assets and units. To assure survivability of these expensive long-range weapons, the forces will employ tactical countermeasures and, where possible, use rapid emplacement and autonomous operations to reduce losses. Some forces employ technical countermeasures to add increased survivability of the launcher and increased probability of missile/warhead success. Countermeasures include improved coatings and camouflage patterns and nets, underground hides/facilities, decoys, and secure communications. These measures are intended to degrade the enemy's detection, targeting, impact or effectiveness kill, and lethality effects.

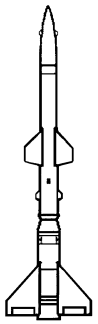
State-of-the-art TBMs can cost more than a million dollars each. If the systems are not accurate enough, or if the enemy has ABM capabilities, those TBMs may not have a high assurance of success, and may not be a factor in the OPFOR plan. The OPFOR may limit its missile requirement to systems used to gain regional political leverage by targeting civilian targets. Thus, budgetary, political, and military considerations affect TBM decisions. Given the budget limitations and systems costs which have impacted most military forces in the last decade, the OPFOR will likely have a mix of older and newer systems and selected upgrades. Systems featured in this chapter are the more common systems, or represent the spectrum of missile systems which can threaten US Army forces or interests within an operational environment.

Questions and comments on data in this specific update should be addressed to Tom Redman, DSN: 552-7925, e-mail: redmant@leavenworth.army.mil. Otherwise, TBM analyst is:

Dr. Don Madill
DSN: 552-7926 Commercial (913) 684-7926
e-mail address: madilld@leavenworth.army.mil

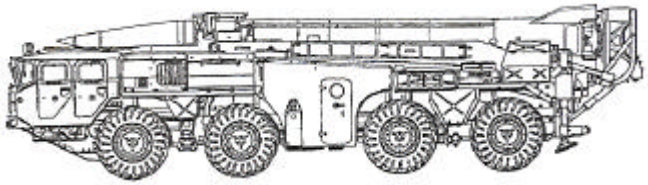


Tochka-U/SS-21

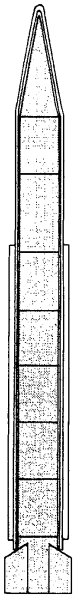


B610 / CSS-8

M-11/ CSS-7



SCUD-B / SS-1c



Nodong-1

DF-3 / CSS-2

Foreign Theater Ballistic Missiles

System Type	SRBM	SRBM	SRBM	SRBM	SRBM	SRBM	SRBM	MRBM	IRBM	**Technologies & Trends**
Name/ NATO Name Designator	Tochka-U SCARAB SS-21 Mod 2	B610 / M-7 CSS-8	SCUD-B SS-1c	SCUD-B SS-1c Mod 2	M-11/ DF-11 CSS-7	SCUD-C SS-1d	M-9/DF-15 CSS-6	Nodong-1	DF-3 CSS-2	More SCUD variants
Producing Country	Russia	China	Russia North Korea	Russia	China	Russia North Korea	China	North Korea	China	Technology Transfer
Proliferation (countries)	At least 6	At least 2	At least 20	At least 1	At least 2	At least 5	At least 1	At least 1	At least 2	Increased proliferation
Type Launcher	TEL	TEL	Fixed, TEL	Fixed, TEL	TEL	Fixed, TEL	TEL	TEL	Fixed, Mobile complex	Mobile/decoy launchers
Propulsion	Single-stage Solid	Single-stage (est) Solid	Single-stage Liquid	Single-stage Liquid	Single-stage Solid	Single stage Liquid	Single-stage Solid	Single-stage Liquid	Single-stage Liquid	Non-ballistic trajectory
Range Min-Max (km)	20-120	50-150	50-300	300	50-300	500	200-600	170-1,300	1,500-3,000+	Increased range
Guidance	Inertial	Inertial	Inertial	Inertial IR homing	Inertial	Inertial	Inertial	Inertial	Inertial	Multi-sensor Homing
Accuracy (m)	50	150	1,000	50	300	<800	600	4,000	2,000-2,500	Improved Guidance
Payload (kg)	480	190	1,000	600	800	700	500-600	770	1,500-2,150	Separating multiple RVs
Warheads	HE, Chem, Nuc, ARM, EMP, Submunitions	HE, Chem	HE, Chem, Nuc	Separating HE, Nuc	Separating HE, Nuc poss Chem	HE, Chem	Separating. HE, Nuc poss Chem Poss Fuel-Air Submuni-tions	HE, Chem poss Nuc	HE, Nuc, or 3 separating reentry vehicles (RVs)	Cluster, Volumetric, Submunitions BW warheads, ARM, EMP
Comments	TEL is amphibious	Modified SA-2 SAM Tracked TEL	Technology widely used	Requires compatible IR imagery	Possible export or technology export to other countries		SCUD-B variant Russia limited production	SCUD-B variant ND-2 IRBM variant Poss export	Variants with varied warheads and ranges Towed launcher Lengthy prep time	Autonomous operation Penaids/ Counter-measures Reduced prep/

										displace times